

## Claims

- [c1] Apparatus for providing fully integrated information processing, management and communication functions in a radiology department/healthcare environment, said apparatus comprising:
- a database server;
  - a radiology information system (RIS) database residing on said database server;
  - a picture archive and communication system (PACS) database residing on said database server; and
  - a database engine residing on said database server to manage said RIS database and said PACS database by providing a brokerless interface between said RIS database and said PACS database.
- [c2] The apparatus of claim 1 further comprising:
- a set of RIS application modules;
  - a set of PACS application modules; and
  - an application server running at least a subset of said set of RIS application modules and said set of PACS application modules.
- [c3] The apparatus of claim 1 further comprising:
- an application server; and
  - at least one Web connection interfacing said application server to at least one client workstation, said at least one client workstation being external to said apparatus.
- [c4] The apparatus of claim 1 further comprising:
- an application server; and
  - a TCP/IP protocol-based interface connecting said application server to said database server thus providing access to information from said database server.
- [c5] The apparatus of claim 1 further comprising:
- at least one image server storing image data; and
  - at least one TCP/IP protocol-based interface connecting said database server to said at least one image server thus providing access to said image data from said at least one image server.

[c6] The apparatus of claim 1 further comprising:  
a set of RIS application modules that are disabled;  
a set of PACS application modules that are enabled; and  
a Health Level Seven (HL7)-based interface providing communication between  
said set of PACS application modules and a RIS system that is external to said  
apparatus.

[c7] The apparatus of claim 1 further comprising:  
a set of PACS application modules that are disabled;  
a set of RIS application modules that are enabled; and  
a standard medical communications interface providing communication  
between said set of RIS application modules and a PACS system that is external  
to said apparatus.

[c8] The apparatus of claim 1 further comprising:  
an application server, wherein said application server is an Enterprise JavaBeans  
(EJB)-based server;  
a set of RIS application modules running on said application server; and  
a set of PACS application modules running on said application server.

[c9] The apparatus of claim 1 further comprising:  
an application server; and  
a reporting module running on said application server and being dedicated to  
the management of diagnostic report functions.

[c10] The apparatus of claim 1 further comprising:  
an application server; and  
an administration module running on said application server and providing  
system administration and configuration functions.

[c11] The apparatus of claim 1 further comprising:  
an application server; and  
a central logging module running on said application server and providing  
application logging and audit logging functions.

[c12] The apparatus of claim 1 further comprising:

an application server; and  
a central user login module running on said application server and providing central user account management support.

[c13] The apparatus of claim 1 further comprising:  
an application server; and  
a patient scheduling module running on said application server and providing automatic scheduling of procedures for patients based on clinical resources available to said patients.

[c14] The apparatus of claim 1 further comprising:  
an application server; and  
a set of default display protocols (DDPs) stored on said database server and applied to a set of medical images for reading said set of medical images in a pre-defined display format.

[c15] The apparatus of claim 1 further comprising:  
an application server; and  
a mammography tracking module running on said application server, said mammography tracking module storing mammography related information on said database server and keeping track of notices sent out and to be sent out to referring doctors and patients, and maintaining all mammography related records for auditing purposes.

[c16] The apparatus of claim 1 further comprising:  
an application server; and  
a patient ordering module running on said application server, said patient ordering module tracking a patient based on a set of ordered procedures as said patient progresses through said set of ordered procedures.

[c17] The apparatus of claim 1 further comprising a visual user interface providing a unified and consistent look and feel for both RIS and PACS applications.

[c18] A method for providing fully integrated information processing, management and communication functions in a fully integrated RIS-PACS system for a radiology department/healthcare environment, said method comprising:

synchronizing patient and exam data entities in a radiology information system (RIS) database and a picture archive and communication system (PACS) database within said RIS-PACS system using brokerless interface methods; and generating direct database calls to said RIS database and said PACS database using said brokerless interface methods.

[c19] The method of claim 18 further comprising:  
running at least one RIS application within said RIS-PACS system; and  
accessing image information from said PACS database in response to said running of said at least one RIS application.

[c20] The method of claim 18 further comprising:  
running at least one PACS application within said RIS-PACS system; and  
accessing patient/exam information from said RIS database in response to said running of said at least one PACS application.

[c21] The method of claim 18 further comprising:  
initiating the running of at least one RIS application and/or at least one PACS application within said RIS-PACS system from at least one client workstation over at least one Web interface; and  
accessing information from said RIS database and/or said PACS database at said at least one client workstation over said at least one Web interface in response to said running of said at least one RIS application and/or said at least one PACS application.

[c22] The method of claim 18 further comprising:  
disabling a set of RIS applications within said RIS-PACS system;  
enabling a set of PACS applications within said RIS-PACS system; and  
communicating between said set of PACS applications and an external RIS system over a HL7-based interface.

[c23] The method of claim 18 further comprising:  
disabling a set of PACS applications within said RIS-PACS system;  
enabling a set of RIS applications within said RIS-PACS system; and  
communicating between said set of RIS applications and an external PACS

system over a standard medical communications interface.

[c24] The method of claim 18 further comprising synchronizing master file data across implemental configurations of said RIS-PACS system, said implemental configurations comprising:  
enabling a set of RIS applications and disabling a set of PACS applications within said RIS-PACS system;  
enabling said set of PACS applications and disabling said set of RIS applications;  
and  
enabling said set of RIS applications and said set of PACS applications.

[c25] The method of claim 18 further comprising presenting a user with a single access point for authentication and authorization of entry into both a set of RIS applications and a set of PACS applications within said RIS-PACS system when said set of RIS applications and said set of PACS applications are enabled.

[c26] The method of claim 18 further comprising:  
creating diagnostic reports within said RIS-PACS system;  
merging diagnostic reports within said RIS-PACS system;  
amending diagnostic reports within said RIS-PACS system; and  
approving diagnostic reports within said RIS-PACS system.

[c27] The method of claim 18 further comprising converting DICOM SR files to XML format for web-based use.

[c28] The method of claim 18 further comprising storing references to key images, within an SR object, that are selected on said RIS/PACS system.

[c29] The method of claim 18 further comprising displaying thumbnail images, corresponding to key images, within a report.

[c30] The method of claim 18 further comprising generating electronic sticky notes for a report.

[c31] The method of claim 18 further comprising flagging reports of highest priority.

[c32] The method of claim 18 further comprising supporting a report repository that

may be queried from other systems that use DICOM.

[c33] The method of claim 18 further comprising:  
changing an implemental configuration of said RIS-PACS system;  
adding a new user to said RIS-PACS system; and  
changing procedure types to be performed by said RIS-PACS system.

[c34] The method of claim 18 further comprising:  
performing application logging functions within said RIS-PACS system; and  
performing audit logging functions within said RIS-PACS system.

[c35] The method of claim 18 further comprising:  
synchronizing user accounts in said RIS database and said PACS database; and  
implementing password requirements for Health Insurance Portability and  
Accountability Act (HIPAA) compliance within said RIS-PACS system.

[c36] The method of claim 18 further comprising:  
pre-defining a set of relationships between exam procedures;  
storing said set of relationships on said RIS-PACS system; and  
automatically scheduling at least a subset of said exam procedures for at least  
one patient based on said set of relationships and clinical resources available to  
said at least one patient.

[c37] The method of claim 18 further comprising:  
defining a set of image display protocols for a set of medical images to be  
examined by a user;  
storing said set of image display protocols on said RIS-PACS system in the form  
of default display protocol (DDP) objects; and  
recalling said set of medical images for viewing by applying said DDP objects  
associated with said set of medical images.

[c38] The method of claim 18 further comprising:  
entering and storing mammography related information in said RIS-PACS  
system from mammography related exams;  
tracking mammography related notices sent out to and to be sent out to  
referring doctors and patients; and

maintaining mammography related records for auditing purposes.

[c39] The method of claim 18 further comprising:  
pre-defining a set of relationships between procedures that occur during a patient exam;  
storing said set of relationships in said RIS-PACS system;  
ordering a set of procedures to be performed for at least one patient based on said set of relationships;  
entering queried updates to said RIS-PACS system based on patient information during the performance of said set of procedures; and  
tracking and billing said at least one patient through execution of said set of procedures in response to said queried updates to said RIS-PACS system.

[c40] The method of claim 18 further comprising providing a unified and consistent look and feel to a user within said RIS-PACS system for both a set of RIS applications and a set of PACS applications.

[c41] The method of claim 18 further comprising converting installed base (IB) reports to structured reports (SR) within said RIS-PACS system.

[c42] A RIS-PACS system providing fully integrated information processing, management and communication functions for a radiology department/healthcare environment, said RIS-PACS system comprising:  
a database server, said database server including a RIS database, a PACS database, and a database engine providing a brokerless interface between said RIS database and said PACS database;  
an application server hosting a set of RIS applications and a set of PACS applications and interfacing to said database server over a TCP/IP protocol-based interface;  
at least one image server interfacing to said database server over at least one TCP/IP protocol-based interface providing access to image data from said at least one image server; and  
at least one client workstation interfacing to said application server over at least one Web interface.

[c43] The RIS-PACS system of claim 42 further comprising a Health Level Seven (HL7)-based interface providing communication between said set of PACS applications and an external RIS system when said set of RIS applications are disabled.

[c44] The RIS-PACS system of claim 42 further comprising a standard medical communications interface providing communication between said set of RIS applications and an external PACS system when said set of PACS applications are disabled.

[c45] The RIS-PACS system of claim 42 wherein said at least one client workstation comprises a web browser.

[c46] The RIS-PACS system of claim 42 wherein said at least one client workstation is a standalone Java client.